

126-3-5/34

Study of the dependence of the bond forces on the state of crystals in metals and solid solutions. (Cont.)
for the characteristic temperature of the solid solutions, Fe-Cr, Fe-Mn, Fe-W, Fe-Ti and for the bond forces in the pure metals Cr, W, Ta and also for the Young modulus of iron and the alloys Fe-Ni, Fe-W, Fe-Cr, Fe-Mn after various types of heat treatment. It was found that the characteristic temperature of the pure metals Fe, Mo, W and Ta does not change after heat treatment and deformation of these metals. In chromium an increase was observed in the characteristic temperature after heating deformed specimens to 600 C; after heating deformed chromium at 800 C its characteristic temperature did not change; it was found that the effect of changes in the characteristic temperature as a function of the heating temperature is reversible. There is a bond force during heat treatment and deformation of the solid solutions Fe-Cr, Fe-W and Fe-Mn: the characteristic temperature increases on heating within a given temperature range and decreases as a result of plastic deformation and hardening (Fe-Cr, Fe-Mn). It was established that there is full correspondence between the direction of the change in the characteristic temperature and the Young modulus, resulting from heat treatment and working of the solid solutions

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Study of the dependence of the bond forces on the state of crystals in metals and solid solutions. (Cont.)

Fe-Cr, Fe-W and Fe-Mn. It is assumed that the revealed phenomenon of a change in the bond forces during heat treatment and working of various solid solutions is due to a redistribution of the atoms in the crystal lattice and that an increase in the bond forces corresponds to an increase of the degree of the near order. There are 10 figures, 6 tables and 24 references, 17 of which are Slavic.

SUBMITTED: December 4, 1956.

ASSOCIATION: Central Ferrous Metallurgy Scientific Research Institute.
(Tsentral'nyy Nauchno-Issledovatel'skiy Institut Chernoy
Card 5/5 Metallurgii).

AVAILABLE: Library of Congress

KRITSKAYA, V. K.

AUTHORS: Il'ina, V. A., Kritskaya, V. K., and Kurdyumov, G. V. 126-2-33/35

TITLE: On the change of the absolute intensities of X-ray interferences of cold deformed iron. (Ob izmenenii absolyutnykh intensivnostey rentgenovskikh interferentsiy kholodnodeformirovannogo zheleza).

PERIODICAL: Fizika Metallov i Metallovedeniye, 1957, Vol.5, No.2, pp. 379-381 (USSR)

ABSTRACT: In X-ray investigations of deformed metals and alloys (Refs.1-7, 10) it was found that there is a weakening in the intensity of the lines of radiograms obtained from deformed specimens as compared to the intensity of the same lines obtained from non-deformed specimens; the degree of weakening is the more pronounced the higher the order of reflection and complies with the law

$$-B\sum_i^2$$

e. The work described in this paper aimed at verifying the correctness of this law and was carried out by means of an ionization method using YPC-50M equipment which incorporated additional equipment for controlling the change in the intensity of the primary beam of X-rays

Card 1/2 (I_0). The investigations were carried out on deformed

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(filed off) and annealed iron powders. The obtained results are entered in a table, p.380 and a graph, Fig.1. Using the ionization method of measuring the absolute intensities, it was again proved that cold plastic deformation brings about a weakening of the intensity of the reflection of the X-rays in accordance with the exponential law

$$e^{-b\sum h_i^2}$$

There are 1 figure, 1 table and 10 references,
4 of which are Slavic.

SUBMITTED: September 6, 1957.

ASSOCIATION: Institute of Metal Technology and Physics of Metals,
TsNIICHM. (Institut Metallovedeniya i Fiziki Metallov
TsNIICHM).

AVAILABLE: Library of Congress.

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Kritskaya, V.K.

AUTHORS: Il'ina, V. A., Kritskaya, V. K., and Kurdyumov, G. V. 126-2-34/35

TITLE: On the weakening of X-ray reflections of α -iron as a result of extinction. (Ob oslablenii rentgenovskikh otrazheniy α -zheleza za schet ekstinktsii).

PERIODICAL: Fizika Metallov i Metallovedeniye, 1957, Vol.5, No.2, pp. 381-383 (USSR)

ABSTRACT: Determination of the static distortions of the crystal lattice (third order distortions) is usually effected by comparing the absolute or the relative intensities of X-ray reflections from equal crystallographic planes of deformed and of annealed metal. It is thereby assumed that a change in the intensity should be due solely to one cause, namely, the existence of a disordered distribution of the displacements in the deformed specimens. The second (annealed) specimen is used as a standard. The preliminary heat treatment of this specimen must be so carried out that there should not be an intensive coarsening of the crystal structure which would lead to a weakening of the intensity of X-ray reflections (extinction). In order to determine the annealing temperature of deformed iron powder at which a weakening of the intensity of the X-ray as a result of

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extinction takes place, the following experiments were made: deformed iron powder was annealed at 500, 650, 700 and 750°C. These powders were used for producing cylindrical specimens of 0.9 mm dia. The X-ray investigation was effected using molybdenum radiation. The X-ray patterns were photometrically evaluated by means of a recording micro-photometer which recorded the curve of intensity distribution on a self-recording electron potentiometer. Each half of the radiograph was photometered twice. The intensity was determined with the following sums of the square values of the indices: 6, 14, 26, 62. Obtained experimental data are entered in Table 1. After annealing at 500 and 700°C the relative intensity of all the measured interference values did not change; only after annealing at 750°C was a weakening observed of the intensity of the X-ray reflections from the planes (211) and (321). The intensity of the same X-ray interference from the planes (510) and (732) remained practically unchanged. In Fig.1

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the effect of the extinction for the various crystallographic planes is graphed. The effect of extinction was also studied in a solid specimen. One of the investigated specimens of hardened iron was tempered successively at 450, 550 and 600°C for two hours and the intensities were measured of the X-ray reflections from the planes with the sum of the square values of the indices 6, 14, 26 and 62 and in the hardened state - 6, 14, 26. The experimental results are entered in Table 2. It can be seen that the effect of extinction in a solid specimen of hardened iron manifests itself even after tempering at 600°C. It can also be seen that type III distortions do not occur during hardening.

Card 3/3 There are 2 tables, 1 figure and 1 Slavic reference.

SUBMITTED: September 6, 1957.

ASSOCIATION: Institute of Metal Technology and Physics of Metals, TsNIICHM. (Institut Metallovedeniya i Fiziki Metallov TsNIICHM).

AVAILABLE: Library of Congress.

GOLUBKOV, V.M.; IL'INA, V.A.; KRITSKAYA, V.K.; KURDYUMOV, G.V.; PERKAS,
M.D.

Studying physical factors determining the hardening of alloyed
iron. Fiz. met. i metalloved. 5 no. 3:465-483 '57. (MIRA 11:7)

1. Institut metallovedeniya i fiziki metallov Tsentral'nogo
nauchno-issledovatel'skogo instituta chernoy metallurgii.
(Iron alloys—Hardening)
(Deformations(Mechanics))

KOZYRSKIY, G.Ya.; KRITSKAYA, V.K.

Binding forces and static distortions in silicon alloyed iron
crystals. Sbor. nauch. rab. Inst. metallofiz. AN URSR no.8:
117-120 '57. (MIRA 11:5)
(Iron alloys—Metallography) (Metal crystals)

SOV/137-58-8-17729

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 8, p 219 (USSR)

AUTHORS: Golubkov, V. M., Il'ina, V. A., Kritskaya, V. K., Kurdyumov, G. V. Perkas, M. D.

TITLE: A Study of Physical Factors Determining the Hardening of Alloyed Fe (Izucheniye fizicheskikh faktorov, opredelyayushchikh uprochneniye legirovannogo zheleza)

PERIODICAL: Sb. tr. In-t metalloved. i fiz. metallov Tsent. n. i. in-ta chernoy metallurgii, 1958, Vol 5, pp 433-461

ABSTRACT: The dimensions of regions of coherent dispersion, D , and the magnitude of distortions of type 2, $\Delta a/a$, in pure Fe and in its α -solid solutions with Ni, Mn, Cr, Mo, V, Co, W, Ti, Nb, and Si were calculated by the width of the reflexes (110) and (220) obtained in FeK_α irradiation and recorded on a URS-501 X-ray spectrometer; the specimens employed were cold-rolled with an 80% reduction and were also cut into pieces and subjected to quenching. In addition, static distortions, $\sqrt{\overline{u_{st}^2}}$, and the characteristic temperature, θ , were determined for the same annealed and deformed specimens by the changes in the intensity of spectra photographed under Mo

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A Study of Physical Factors Determining the Hardening of Alloyed Fe

irradiation at -183°C and at room temperature. Micromechanical tests were conducted concurrently on a model RF-2 machine, and tensile stress-strain diagrams were plotted. Tables with values of D , $\Delta a/a$, $\sqrt{\frac{\sigma_s^2}{\sigma_{st}^2}}$, σ_s , $\sqrt{\frac{\sigma_b^2}{\sigma_{st}^2}}$, and H_v are given. It is shown that the magnitudes of D (2.4×10^{-6} cm), $\sqrt{\frac{\sigma_b^2}{\sigma_{st}^2}}$ (≈ 0.120 angstrom), and σ were fairly close to common values for almost all alloys that had been deformed. The authors comment on the fluctuations of the $\Delta a/a$ value, which varies from 0.5 to 2.5×10^{-3} for different alloys and emphasize the correspondence which exists between its magnitude and the tensile-strength characteristics of the deformed alloys. The difference in magnitudes of σ and $\sqrt{\frac{\sigma_s^2}{\sigma_{st}^2}}$ of alloys in the annealed state is also pointed out. The mechanism of deformation and the effect of the factors indicated above on hardening of alloyed Fe are discussed. Bibliography: 37 references.

1. Iron alloys—Physical properties
2. Iron alloys—Hardening
3. Mathematics

A. B.

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Translation from: Referativnyy zhurnal. Metallurgiya, 1959, Nr 1, p 129 (USSR) SOV/137-59-1-948

AUTHORS: Il'ina, V. A., Kritskaya, V. K., Kurdyumov, G. V., Osip'yan, Yu. A., Stelletskaya, T. I.

TITLE: Study of the Dependence of the Bonding Forces on the State of Crystals of Metals and Solid Solutions (Izucheniye zavisimosti sil svyazi ot sostoyaniya kristallov metallov i tverdykh rastvorov)

PERIODICAL: Sb. tr. In-t metalloved. i fiz. metallov Tsentr. n-i. in-ta chernoy metallurgii, 1958, Vol 5, pp 462-484

ABSTRACT: Ref. RzhMet, 1958, Nr 5, abstract 10396

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AUTHORS: Golubkov, V.M., Il'ina, V.A., Kritskaya, V.K.,
Kurdyumov, G. V. and Perkas, M.D. 126-5-3-12/31

TITLE: Study of the Physical Factors which Determine the
Hardening of Alloyed Iron (Izucheniye fizicheskikh
faktorov, opredelyayushchikh uprochneniye legirovannogo
zheleza)

PERIODICAL: Fizika Metallov i Metallovedeniye, 1958, Vol 5, Nr 3,
pp 465-483 (USSR)

ABSTRACT: This paper is devoted to the study of the physical
factors which determine the hardening of α -iron alloyed
with various elements; considering only hardening which
is due fully to changes in the fine structure of the
 α -solid solution without any changes in its chemical
composition. In the experiments iron was used alloyed
with various elements; the chemical compositions of the
respective binary alloys of iron are entered in Table 1,
p.465. The material was produced in a high frequency
furnace with ingot weights of 25 kg. All the ingots were
subjected to diffusion annealing at 1200°C for twenty
hours. After homogenization annealing, the ingots were
forged to a square 50 x 50 mm. After forging most of
the ingots were annealed for the purpose of obtaining a
uniform grain size. After forging and annealing, the

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blanks were cold rolled with a total reduction of 80% and from the produced strips flat specimens were cut which were used for measuring the hardness and also for micro-mechanical investigations. The alloys Fe + 3% Mn, Fe + 4% Ni, Fe + 8% Cr were also hardened by quenching in a 10% NaOH solution after the specimens have been heated in a salt bath to 1000°C. The alloys Fe + 3% Mn, Fe + 0.5% Ti, Fe + 0.6% W and non-alloyed iron were also used for studying the influence of step-wise deformation on the changes in the characteristics of the fine structure. Specimens with initial dimensions of 70 x 15 x 8 mm were deformed in the cold state (on a laboratory rolling stand) with reductions of 5, 10, 15, 20, 30, 50, 80 and 90%. The characteristic of the fine structure was also studied on filings obtained from the alloys Fe + 1.84% Co, Fe + 1.8% Mo, Fe + 2.28% V, Fe + 3% Mn, Fe + 4% Ni, Fe + 8% Cr. Distortions of the third type and the characteristic temperature were determined predominantly on specimens produced from powders. The fundamental methods of studying the influence of alloying elements on

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the hardening of the ferrite were: X-ray structural analysis and mechanical tests. The authors investigated the relation between the fine crystalline structure of α -iron base solid solutions in the work hardened state and also some of the mechanical properties of these alloys. Hardening of the alloys was achieved by cold plastic deformation as a result of the martensitic γ to α transformation mechanism. For changing the properties of the crystals of α -iron in the micro and sub-micro ranges (properties of the crystal lattice of the α -solid solution), the iron was alloyed by various elements, namely: Si, Ti, V, Cr, Mn, Co, Ni, Nb, Mo, W. By means of X-ray structural methods the following properties of α -phase crystals were studied in the sub-micro regions: static lattice distortions caused by the presence of foreign atoms in the lattice; dynamic displacements of the atoms during thermal oscillations and the characteristic temperature; magnitude of the elastic deformation of the lattice caused by cold plastic deformation. As characteristics of the fine crystalline structure of the alloys in the hardened state the following were applied: size of the regions of the

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coherent scattering of X-rays (mosaic block), distortions of the second type and of the third type. The mechanical properties of the micro-volumes were characterised by the hardness, the yield point and the strength values. The results led to the following conclusions:

1. A characteristic feature of alloys in the hardened state obtained by a high reduction in the cold state or as a result of the γ to α martensitic transformation is the low value of the regions of coherent scattering of X-rays. The size of these regions for all these alloys is within the limits of 200 to 400 Å. The observed difference in the size of the blocks is near to the limit of the error in measuring them. However, the strength characteristics change within wide limits on changing over from one alloy to another (hardness H_V between 172 and 340; σ_s between 54 and 113 kg/mm²). Thus, the great difference in the resistance to deformation of various alloys in the hardened state cannot be attributed to changes in the sizes of the blocks.

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2. The presence of various elements in the solid solution

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influences to a considerable extent the type II distortions (non-uniform micro-stresses) in deformed as well as in hardened alloys. A correspondence exists between the magnitude of these type II distortions and the strength values of alloys in the hardened state.

3. High degrees of plastic deformation bring about considerable type III distortions. In the investigated solid solutions considerable displacements of the atoms take place in alloys in the annealed state, which is caused by the presence in the atom lattice of dissolved elements; $\sqrt{u_{cm}^2}$ varied between 0.058 and 0.120 Å (\bar{u}_{cm}^2 being the magnitude of the static displacements of the atoms). After deformation with a high degree of reduction in the cold state (filings) the magnitude of $\sqrt{u_{cm}^2}$ increased approximately

to the same level (about 0.100 to 0.120), which is near to the level of type III distortions in cold deformed non-alloyed iron. The higher the value of $\sqrt{u_{cm}^2}$ for the

Card 5/9 "equilibrium" solid solution, the smaller was the change

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in this magnitude as a result of the deformation.

4. After hardening of the alloyed iron to martensite, the magnitude of the static displacements did not increase. Thus, in alloys hardened by means of martensitic transformation no type III distortions occur, although the strength characteristics approach those of materials deformed in the cold state. This could be seen particularly clearly on specimens of pure iron, hardened to produce martensite. No type III distortions were detected and hardening, block sizes and type II distortions were on the same level as in the case of iron deformed in the cold state. Consequently, presence of type III distortions at least of a magnitude detected in measurements by means of intensive X-rays is not a necessary condition for obtaining a high resistance to deformation.

5. Investigation of the fine crystalline structure as a function of the degree of plastic deformation carried out on pure iron and on some solid solutions has shown that with increasing degree of deformation the hardness, the type II and type III distortions increase, whilst the sizes of the

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blocks decrease. These characteristics change most rapidly for low degrees of deformation; for deformations of 30 to 70% the change of these characteristics is slow. For higher degrees of deformation the speed of the change in the characteristics increases again. The behaviour of the metal in the case of very high degrees of plastic deformation requires further detailed investigation. 6. The obtained results permit the conclusion that breaking up of the regions of coherent scattering is a necessary condition for increasing the resistance to deformation of the metals (in the case of the "sliding" mechanism of plastic deformation). The differences in the absolute magnitudes of the characteristics of the resistance to deformation for various metals and solid solutions is due mainly to the differing properties of the crystals in the micro and sub-micro regions (character and force of the bond, static distortions and other deviations from the regular periodicity of the lattice) and not by changes in the size of these regions. Card 7/9 The established correspondence between the resistance to

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deformation and the magnitude of type II distortions should not be taken as an indication of the major role of these distortions from the point of view of hardening. It can be assumed that the magnitude of these distortions (non-uniform elastic deformations of the micro-regions) is itself due to the properties of the crystallites of the given material. From this point of view the magnitude of type II distortions serves as an evaluation of the limit of elastic deformation of the micro-regions and can be considered as being a definite characteristic of the properties of the crystallites of a given substance. It is also possible that the observed type II distortions influence the resistance to deformation causing an increase in the degree of deorientation of the blocks. The experimental data obtained in the here described work on the relation between the fine structure and the strength of a material permit establishing certain relations governing these phenomena and leads to a number of new problems, the elucidation of which by further experiments is important from the point of view of

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Alloyed Iron 126-5-3-12/31

understanding the nature of strength and hardening (work
hardening) of metals and alloys.
There are 6 figures, 6 tables and 38 references,
29 of which are Soviet, 9 English.

ASSOCIATION: Institut metallovedeniya i fiziki metallov (TsNIICHM)
(Institute of Metallography and Metal Physics TsNIICHM)

SUBMITTED: December 4, 1956

1. Iron alloys--Hardening
2. Iron alloys--Physical properties
3. Iron alloys--X-ray analysis
4. Iron alloys--Crystal structure

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AUTHORS: Kritskaya, V. K., Nodia, N. M. and Osip'yan, Yu. A. SOV/126-6-1-28/33
 TITLE: On the Bonding Forces in Martensite Crystals (K voprosu o silakh svyazi v kristallakh martensita)
 PERIODICAL: Fizika Metallov i Metallovedeniye, 1958, Vol 6, Nr 1, pp 177-181 (USSR)
 ABSTRACT: It was shown in Refs.1-4 that the introduction of carbon into α -iron leads to a change in the bonding forces. In the present paper the bonding forces in the martensite crystals are investigated by measuring Young's modulus under different conditions. Young's modulus is determined by measuring the resonance frequency of elastic longitudinal vibrations of specimens in the form of rods. The modulus was calculated from the following formula

$$E = \frac{4F^2 l^2 \rho}{981 \cdot 10^{+5}} \text{ (kg/mm}^2\text{)}$$

(F = natural frequency of longitudinal vibrations, l = length of the rod and ρ = density). The vibrations were produced by an LIG-40 sonic generator. Experiments have shown that changes in Young's modulus of martensite

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On the Bonding Forces in Martensite Crystals SOV/126-6-1-28/33

as the carbon content increases are in the same direction as the changes in the characteristic temperature. In the case of 0.1% carbon content Young's modulus does not change compared with the modulus for pure iron. At higher temperatures it decreases. The results are summarised in figures and a table. There are 5 figures, 1 table and 5 references, all of which are Soviet.

ASSOCIATION: Institut metallovedeniya i fiziki metallov TsNIIChM
(Institute of Metallography and Physics of Metals
TsNIIChM)

SUBMITTED: October 29, 1956.

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1. Martensite crystals--Bonding 2. Martensite crystals---
Vibration 3. Carbon--Metallurgical effects 4. Mathematics---
Applications

24(2), 21(7)

AUTHORS: Batenin, I. V., Il'ina, V.A., Kritskaya, V.K. and Sharov, B.V. SOV/126-7-2-12/39

TITLE: On the Effect of Neutron Irradiation on the Fine Crystalline Structure of Metals and Alloys (K voprosu o vliyanii neytronnogo oblucheniya na tonkuyu kristallicheskuyu strukturu metallov i splavov)

PERIODICAL: Fizika Metallov i Metallovedeniye, 1959, Vol 7, Nr 2, pp 243-246 (USSR)

ABSTRACT: The metals investigated were Fe, Cr, Ni and Cu and the solid solutions were Fe-Ni, Fe-Cr, Fe-Mn, and Fe-W. Specimens were made up of each of these materials, their size being 20 x 10 x 2 mm. As a preliminary step before the irradiation all the specimens were annealed at the following temperatures: Ni and Cu at 400°C (30 minutes), Fe and the alloys Fe-Ni and Fe-Mn at 600°C (2 hours), Fe-Cr and Fe-W at 650°C (2 hours) and Cr at 900°C (2 hours). The specimens thus treated were placed in hermetically sealed aluminium containers and were then irradiated by neutrons. The temperature of the specimens during irradiation did not exceed 80°C. The neutron flux was 10^{20} neutrons/cm². The structure of the irradiated

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On the Effect of Neutron Irradiation on the Fine Crystalline
Structure of Metals and Alloys

metals and alloys was studied by X-ray analysis. It was found that in the majority of specimens the interference lines become broadened after neutron irradiation. Table 2 gives the line widths of the interference lines before and after irradiation. Figs 1 and 2 show the corresponding lines before and after irradiation. These figures refer to copper (Figs 1 and 2) and Fe-Ni respectively. There are 2 tables, 3 figures and 19 references, 5 of which are Soviet, 14 English.

ASSOCIATIONS: ITEF AN SSSR and Institut metallovedeniya i fiziki
metallov TsNIICHM (Institute of Metallography and the
Physics of Metals TsNIICHM)

SUBMITTED: September 6, 1957

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18(4), 18(6)

AUTHORS:

Kurdyumov, G. V., Academician, SOV/20-124-1-21/69
Kritskaya, V. K., Latayko, P. A., Osip'yan, Yu. A.

TITLE:

On the Variation of the Forces of Interatomic Bond in a
Single-phase Solid Solution Nickel-aluminum (Ob izmeneniyakh
sil mezhatomnoy svyazi v odnofaznom tverdom rastvore nikel'-
alyuminiy)

PERIODICAL:

Doklady Akademii nauk SSSR, 1959, Vol 124, Nr 1, pp 76-78
(USSR)

ABSTRACT:

Short reference is first made to earlier papers dealing with
this subject. The castings of the nickel-aluminum alloy
(8.3 atomic % Al) were annealed for 100 hours at 1,150°. The
forging of the casting up to a cross section of 40 x 25 mm²
began at 1,000° and was completed at a temperature of
~400-500°. Towards the end of the forging process the
casting had already assumed a dark color. The forged work-
pieces were then cold-drawn and from them samples of 100 mm
length and 10 mm diameter were produced. On these samples,
Young's modulus was determined by measurement of the
resonance frequencies in the case of longitudinal oscillations
of the rod at room temperature. The results obtained by these

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measurements are shown by a diagram for various initial alloy states. In the cold deformed and in the hardened state Young's modulus of the alloy is higher by 6 % than in the case of an annealed alloy. In order to convey the alloy from a state with a high modulus (state B) into one of a low modulus (state A) it is necessary to heat it up to temperatures of more than 600-700°, after which it is gradually cooled down. With heating up to 700-1,000°, Young's modulus gradually decreases. For the purpose of conveying the alloy from state A into state B it is sufficient to heat up to 300° with subsequent cooling in water. Already after heating up to 100° the modulus is noticeably increased. The state A does not change if cooling takes place slowly after heating to 300° or higher temperatures. These data make it possible to draw the conclusion that state B in a hardened alloy is not produced by undercooling of a steady state at high temperatures down to room temperature, but rather by such a transformation which occurs in the alloy only in the case of rapid cooling within the temperature interval of from 300° and room temperature. If the alloy is heated in state A up to

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300°, no essential changes occur in it either during heating or during aging. A change occurs only during rapid cooling. From the data discussed it further follows that the state B, which is produced by the rapid cooling of the alloy at a temperature below 300°, is a metastable state, which, in the case of a sufficiently high temperature, i.e. in the case of sufficient atomic mobility, may go over into the stable state A. At present, the nature of the alloys with high Young's modulus and the nature of the transition A → B is not yet known. The Debye X-ray pictures showed no difference between the crystal structures of the alloy in the states A and B. However, an essential difference was observed with respect to the microstructure of the alloy. Similar results were obtained also for a solid solution Ni - Cu (10.8 atom % Cu). There are 3 figures and 8 references, 5 of which are Soviet.

SUBMITTED: September 26, 1958

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~~18 (6), 18 (7)~~ 18.1250, 18.8200
 AUTHORS: Kritskaya, V. K., Kurdyumov, G. V.,
 Academician, Osip'yan, Yu. A.

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SOV/20-129-3-21/70

TITLE: On the Nature of the Variations of Young's Modulus in the
 Thermal Treatment of Single-phase Alloys on the Basis of Nickel

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 129, Nr 3, pp 550-552 (USSR)

ABSTRACT: The present paper investigates the dependence of the elastic
 modulus on thermal treatment carried out on samples of pure
 nickel (electrolytic nickel twice remelted in a vacuum) and on
 some solid solutions on a nickel basis (Ni + 10% Cu, Ni + 10% Co,
 Ni + 3.5% Mo). All these alloys were single-phased during the
 entire interval of the heat treatment. Both in the case of nickel
 and in all alloys investigated, the variations of the elastic
 modulus depend on the manner in which they are cooled down from
 high temperatures. The dependence of the elastic modulus on the
 temperature of thermal treatment is shown in a diagram. For
 nickel and for all solid solutions this dependence is qualitatively
 the same; it is similar to the dependence for the alloy Ni-Al.
 The differences between the values of the elastic modulus in the
 state A (with a low value of the elastic modulus) and the state B
 (with a high value of the elastic modulus) fluctuate between 5% for

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nickel and 12% for the alloy Ni - Co. A microstructure with many lines of slide is characteristic of the state B. A vertical displacement along the individual slide lines could be observed in the interference microscope. In the states A and B the investigated alloys have not only different values of the elastic modulus at room temperature, but also a different temperature dependence of the elastic modulus. For the annealed samples (state A) the temperature dependence of the elastic modulus has an anomalous character within the temperature interval of from room temperature to Curie point and is represented by means of a curve with a minimum. After quenching from a temperature that is higher than that of the total transition A → B, this anomaly of the elastic modulus vanishes, and in the state B it decreases in a monotonic manner with increasing temperature in the case of all alloys. After quenching and annealing, the difference between the values of the elastic modulus of nickel and its solid alloys is not determined by the difference in the strength of the binding forces, but by the influence exerted by the structure upon the mechanostriictional

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On the Nature of the Variations of Young's Modulus in the SOV/20-129-3-21/70
Thermal Treatment of Single-phase Alloys on the Basis of Nickel

deformation of the ferromagnetic samples. The stresses
leading to sliding in the case of rapid cooling are not due to
a magnetic transformation during cooling. There are
4 figures and 4 references, 2 of which are Soviet. *4*

SUBMITTED: August 3, 1959

Card 3/3

84684

21.6200

1138, 1403, 2308 only

S/020/60/134/004/008/023
B019/B067

AUTHORS:

Batenin, I. V., Il'ina, V. A., Kritskaya, V. K.,
Kurdyumov, G. V., Academician, and Sharov, B. V.

TITLE:

Effect of ¹⁹Neutron Irradiation on the Crystalline Fine
Structure and the Properties of Metals and Alloys

PERIODICAL:

Doklady Akademii nauk SSSR, 1960, Vol. 134, No. 4,
pp. 802 - 805

TEXT: The authors studied the broadening of X-ray interference lines of iron, iron alloys, and copper by neutron irradiation ($10^{20} - 10^{21}$ n/cm²). Prior to the experiments the samples were annealed at 600 - 650°C. Fig. 1 shows the changes of the (220)- and (400) interference lines of iron and copper due to neutron irradiation, Fig. 2 shows two X-ray photographs of copper (before and after irradiation). In Table 1 the changes in the widths of the interference lines are summarized:

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Effect of Neutron Irradiation on the Crystalline Fine Structure and the Properties of Metals and Alloys S/O20/60/134/004/008/023 B019/B067

Table 1

Material	Indices of the reflecting surfaces	Line widths		Distortions of II kind $\Delta a/a \cdot 10^3$	Block dimensions $D \cdot 10^6$ cm
		before irradi.	after irradi.		
Fe	(110)	5.0	5.6	0.65	8
	(220)	7.3	9.4		
Cu	(200)	5.9	7.0	1	5
	(400)	11.0	15.6		

In Table 2 the changes in microhardness are given. The values are between 26 and 66%, according to material and irradiation intensity. Since the changes in the interference lines are the same as in cold-forming, the authors conclude that neutron irradiation leads to a reduction of the regions of coherent scattering and to microtensions, as is the case in cold-forming. The solidification of the material is connected with the change in the crystal properties in the microregions. Here, the resistance to dislocations in the lattice is increased. The authors conclude there-

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84684

Effect of Neutron Irradiation on the Crystalline Fine Structure and the Properties of Metals and Alloys S/020/60/134/004/008/023 B019/B067

from that the increase in microhardness is summed by irradiation and cold-forming. This exactly applies for iron, as is shown by the diagrams in Fig. 2. For the anomalous behavior of an iron tungsten alloy (6% W) it is assumed that irradiation not only causes defects of the type "external atomic vacancies" as is usually the case but also a change in the distribution of the tungsten atoms in the direction of the thermodynamically more stable state. There are 3 figures, 2 tables, and 6 Soviet references.

ASSOCIATION: Institut teoreticheskoy i eksperimental'noy fiziki Akademii nauk SSSR (Institute of Theoretical and Experimental Physics of the Academy of Sciences USSR). Institut metallovedeniya i fiziki metallov Tsentral'nogo nauchno-issledovatel'skogo instituta chernoy metallurgii im. I. P. Bardina (Institute of Metallography and Metal Physics of the Central Scientific Research Institute of Nonferrous Metallurgy imeni I. P. Bardin)

SUBMITTED: June 29, 1960
Card 3/3

AMITSKAYA, V. K.

90

PHASE I BOOK EXPLOITATION

SOV/6176

Konobeyevskiy, S. T., Corresponding Member, Academy of Sciences
USSR, Resp. Ed.

Deystviye vadernykh izlucheniv na materialy (The Effect of
Nuclear Radiation on Materials). Moscow, Izd-vo AN SSSR,
1962. 383 p. Errata slip inserted. 4000 copies printed.

Sponsoring Agency: Akademiya nauk SSSR. Otdeleniye tekhnicheskikh nauk; Otdeleniye fiziko-matematicheskikh nauk.

Resp. Ed.: S. T. Konobeyevskiy; Deputy Resp. Ed.: S. A. Adasinskiy; Editorial Board: P. L. Gruzin, G. V. Kurdyumov, B. M. Levitskiy, V. S. Lyashenko (Deceased), Yu. A. Martynyuk, Yu. I. Pokrovskiy, and N. F. Pravdyuk; Ed. of Publishing House: M. G. Makarenko; Tech. Eds: T. V. Polyakova and I. N. Dorokhina.

Card 1/14

The Effect of Nuclear Radiation (Cont.)

90
SOV/6176

PURPOSE: This book is intended for personnel concerned with nuclear materials.

COVERAGE: This is a collection of papers presented at the Moscow Conference on the Effect of Nuclear Radiation on Materials, held December 6-10, 1960. The material reflects certain trends in the work being conducted in the Soviet scientific research organization. Some of the papers are devoted to the experimental study of the effect of neutron irradiation on reactor materials (steel, ferrous alloys, molybdenum, avial, graphite, and nichromes). Others deal with the theory of neutron irradiation effects (physico-chemical transformations, relaxation of internal stresses, internal friction) and changes in the structure and properties of various crystals. Special attention is given to the effect of intense γ -radiation on the electrical, magnetic, and optical properties of metals, dielectrics, and semiconductors.

Card 2/14

The Effect of Nuclear Radiation (Cont.)

SOV/6176

Batenin, I. V., V. A. Il'ina, V. K. Kritskaya, G. V. Kurdyumov, and B. V. Sharov. Investigation of the Effect of Neutron Irradiation on Thin Crystalline Structure and Properties of Metals and Alloys

160

Annealed specimens (copper at 400°; iron and iron-nickel at 600°; iron-chromium and iron-tungsten at 650°; and chromium at 900°) were irradiated with neutron fluxes of $\sim 10^{20}$ and $\sim 10^{21}$ n/cm² at a temperature not exceeding 80°[C?].

Karpukhin, V. I., and V. A. Nikolayenko. Remote Controlled Installation for X-Ray Diffraction Analysis of Radioactive Specimens

168

Levitskiy, B. M., and Yu. A. Martynyuk. Installation for X-Ray Examination of Highly Active Specimens

173

Sharov, B. V., I. V. Batenin, and A. N. Rudenko. X-Ray Unit for Structural Investigation of Radioactive Materials

180

Card 8/14

5/717/62/000/007/002/010
D207/D301

AUTHORS: Il'ina, V.A., Kritskaya, V.K., Candidate of Physico-Mathematical Sciences, Kurdyumov, G.V., Member of the Academy of Sciences, USSR, and Osip'yan, Yu.A.

TITLE: On the nature of changes of Young's modulus and the characteristic temperature due to heat treatment of nickel-based solid solutions

SOURCE: Dnepropetrovsk. Institut metallovedeniya i fiziki metallov. Problemy metallovedeniya i fiziki metallov, no. 7, Moscow, 1962, 34 - 63

TEXT: Mechanical and other properties of nickel and its alloys were investigated as a function of their heat treatment and in relation to their microstructure. Apart from nickel, the following nickel alloys were studied: 1) With 2.9 % Al, 2) 5.7 % Al, 3) 11.5 % Cu, 4) 10.2 % Co, 5) 9.8 % Co, 6) 10.3 % Fe, 7) 14.5 % Mo, 8) 5.6 % Mo, 9) 20 % Cr. All these alloys contained also small amounts of C, Si, Mn, P and S. They were prepared in a high-frequency furnace, subject-

Card 1/3

S/717/62/000/007/002/010
D207/D301

On the nature of changes of Young's ...

ted to homogenizing annealing (24 hours at 1200°C), forged, rolled and drawn into wires of 1 and 0.7 mm diameter. The following properties were studied: Young's modulus and its temperature dependence, shear modulus, internal friction, electrical resistance, Debye-Waller temperature factor, Debye characteristic temperature, and microstructure. Increases of Young's modulus, the Debye-Waller temperature factor and the Debye temperature were observed on heating, following deformation and quenching of the Ni-Cr (nichrome) alloy and on heating, following deformation of the Ni-Al and Ni-Cu alloys. The increases were due to redistribution of the component atoms leading to formation of the K-state. Young's modulus, its temperature dependence, shear modulus and internal friction of the ferromagnetic Ni-Al, Ni-Cu, Ni-Co and Ni-Mo solid solutions were all affected by the rate of cooling from $300 - 400^{\circ}\text{C}$. Slip lines were observed after quenching of these ferro-magnetic alloys. The changes in the elastic constants and internal friction were due to defects formed on quenching which affected magnetostrictive and elastic properties of the ferromagnetic alloys. There are 26 figures, 2 tables and 30 references: 22 Soviet-bloc and 8 non-Soviet-bloc. The references to the English-lan-

Card 2/3

On the nature of changes of Young's ...

S/717/62/000/007/002/010
D207/D301

guage publications read as follows: A. Taylor, and K. Hinton, J.Inst. Metals, 81, 4, 169, 1952-3; F. Nordheim and N. Grant, J.Inst.Metals, 82, 9, 440, 1953-4; S. Siegel and S. Quimby, Phys.Rev., 49, 663, 1936

Card 3/3

S/126/62/013/001/013/01B
E091/E580

18.6700

AUTHORS: El'ina, V.A., Kritskaya, V.K. and Kurdyumov, G.V.
TITLE: Study of the intensity of X-ray diffraction lines of cold worked metals
PERIODICAL: Fizika metallov i metallovedeniye, v.13, no.1, 1962, 132-136

TEXT: In previous papers the authors reported on changes of the integrated intensity of diffraction lines obtained with Mo-K α radiation on α -iron. It was found by both photographic and ionization methods that plastic deformation of iron caused a decrease in intensity, the effect being the greater the higher the order of reflection. In the present study, the use of a scintillation counter and monochromatic irradiation enabled a more accurate study of changes in the intensity and the shape of lines. Powders of α -iron and other metals, both cold worked and annealed, were investigated. X-ray diffraction patterns of the same materials were also photographed, and the relative intensities of a number of lines were determined. The results obtained varied: using the photographic method, a weakening of the integrated intensity was observed after deformation, whereas the scintillation
Card 1/2

Study of the intensity of X-ray ... S/126/62/013/001/013/018
E091/E580

counter did not show any difference between annealed and cold worked α -iron. A comparison of diffraction lines obtained by the photographic method and by using a scintillation counter showed that they differ mainly in their ratio between line intensity and background intensity. In the second case, this ratio is considerably greater; this permits the measurement of the intensity of diffuse lines with a greater accuracy. Hence, a fairly reliable measurement of the intensity of reflections of higher orders becomes possible. There are 3 figures.

ASSOCIATION: Institut metallovedeniya i fiziki metallov TsNIIChM
(Institute of Science of Metals and Physics of
Metals TsNIIChM)

SUBMITTED: September 1, 1961

Card 2/2

L 9231-66 HNT(m)/EPE(n)-2/T/EWP(t)/EWP(b)/EWA(h)/EWA(c) GO/JD/GS
ACC NR: AT5023793 SOURCE CODE: UR/0000/62/000/000/0160/0167

AUTHOR: Batenin, I. V.; Il'ina, V. A.; Kritskaya, V. K.; Kurdyunov, G. V.;
Sharov, B. V. 55 55 55 55 66
65
B+1

ORG: none

TITLE: Investigation of the effect of neutron on the fine crystalline structure and
properties of metals and alloys 11.55

SOURCE: Soveshchaniye po probleme Deystviye yadernykh izlucheni na materialy.
Moscow, 1960. Deystviye yadernykh izlucheni na materialy (The effect of nuclear
radiation on materials); doklady soveshchaniya. Moscow, Izd-vo AN SSSR, 1962,
160-167 55, 16

TOPIC TAGS: copper, iron, chromium, iron alloy, nickel containing alloy, chromium
containing alloy, tungsten containing alloy, metal structure, alloy structure,
neutron irradiation, irradiation effect

ABSTRACT: Copper, iron, and chromium annealed at 400, 600, and 900C, respectively,
and ⁵⁷Fe-Ni, ⁵⁷Fe-Cr, and Fe-W alloys annealed at 600, 600, and 650C, respectively,
were irradiated with an integrated neutron flux of about 10^{20} and 10^{21} n/cm² at
80C. Irradiation caused a noticeable widening of interference x-ray lines in copper
and iron resulting from fragmentation of coherent portions of the crystalline
lattice (block) (5×10^{-6} and 8×10^{-6} cm in copper and iron, respectively) and from
the presence of elastic microdeformations (1×10^{-3} and 0.65×10^{-3} in copper and
Card 1/2

L 9234-66

ACC NR: AT5023793

iron, respectively). In the Fe-Ni alloy the widening of interference lines was much smaller, and none was observed in chromium and in the Fe-Cr and Fe-W alloys. Irradiation increased the microhardness of all the investigated metals and alloys; the increase varied for different metals and grew larger as flux density increased from 10^{20} to 10^{21} n/cm². The microhardness of the irradiated Fe-W alloy practically did not increase with a cold deformation of up to 60—70 deg, while that of the unirradiated alloy increased significantly with deformation, regardless of its magnitude. In the irradiated and unirradiated Fe-Ni alloy the changes in microhardness with cold plastic deformation were practically identical. The initial difference (ΔH_0 45 units) in the microhardness of the irradiated and unirradiated Fe-Ni alloy practically disappeared with a 30—40-deg cold deformation, after which the changes in microhardness followed a conventional course. A similar pattern was observed for irradiated and unirradiated chromium, except that the initial difference (ΔH) was 30 units and it decreased to zero after a 70—80 deg deformation. Investigation of the dependence of the microhardness on the annealing temperature showed that the nature of the crystal lattice defects, created by plastic deformation differed substantially from the nature of the defects created by neutron irradiation. The former were much more stable; hence, weakening of irradiated metals began at appreciably lower annealing temperatures. Orig art. has: 15 figures. [MS]

SUB CODE: 11, 20/ SUBM DATE: 18Aug62/ ORIG:REF: 001

Cord 3/2

----- Satenin, I. V.; Il'ina, V. A.; Kritskaya, V. K.; Sharov, S. I.

AT 11207

IT WAS FOUND THAT THE
RECORDS OF THE
OFFICE OF THE
DIRECTOR OF THE
CENTRAL INTELLIGENCE
AGENCY (CIA) CONTAIN
A RECORD OF THE
ACTIVITIES OF THE
OFFICE OF THE
DIRECTOR OF THE
CENTRAL INTELLIGENCE
AGENCY (CIA) FROM
1947 TO 1963.

1. NO.

2.

ENCL: 00

DATE: 08/11/64

OTHER: 017

AN SSSR. Doklady*, v. 158, no. 4, 1964, 843-845

TOPIC TAGS: iron, copper, tungsten, radiation damage, neutron irradiation, crystallography

The purpose of the investigation is to study the radiation damage in a crystal lattice of metals. The authors have obtained a fine-crystalline sample of tungsten, which was irradiated with neutrons. The results of the investigation are presented in the form of a diagram showing the change in the intensity of the diffraction peaks as a function of the dose of the irradiation.

1 12915-65

ACCESSION NR: AP4047324

and Experimental Physics, at a fast-neutron dose 10^{20} n/cm² the
sample was kept at 80°. The x-ray counting rates were measured
with a scintillation-counting setup in molybdenum monochromatic

neutrons. The x-ray diffraction pattern was measured with a

scintillation counter and a silicon crystal monochromator.

The x-ray diffraction pattern was measured with a

scintillation counter and a silicon crystal monochromator.

The x-ray diffraction pattern was measured with a

scintillation counter and a silicon crystal monochromator.

The x-ray diffraction pattern was measured with a

scintillation counter and a silicon crystal monochromator.

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scintillation counter and a silicon crystal monochromator.

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scintillation counter and a silicon crystal monochromator.

The x-ray diffraction pattern was measured with a

scintillation counter and a silicon crystal monochromator.

L 12915-65

ACCESSION NR: AP4047324

ASSOCIATION: Institut metallovedeniya i fiziki metallon Tsentrall-

Experimental Physics

DATE: 10 Apr 64

ENCL: 00

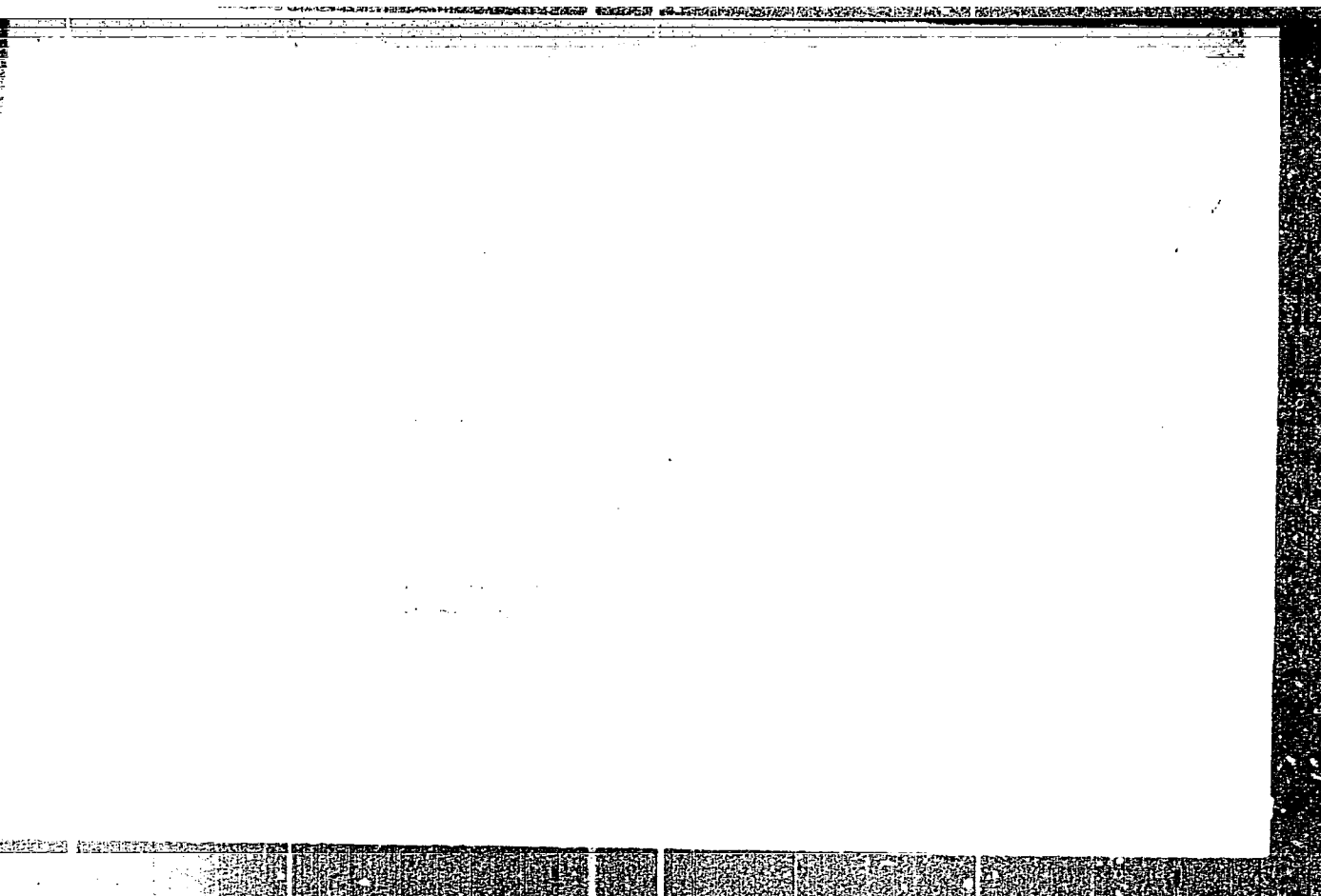
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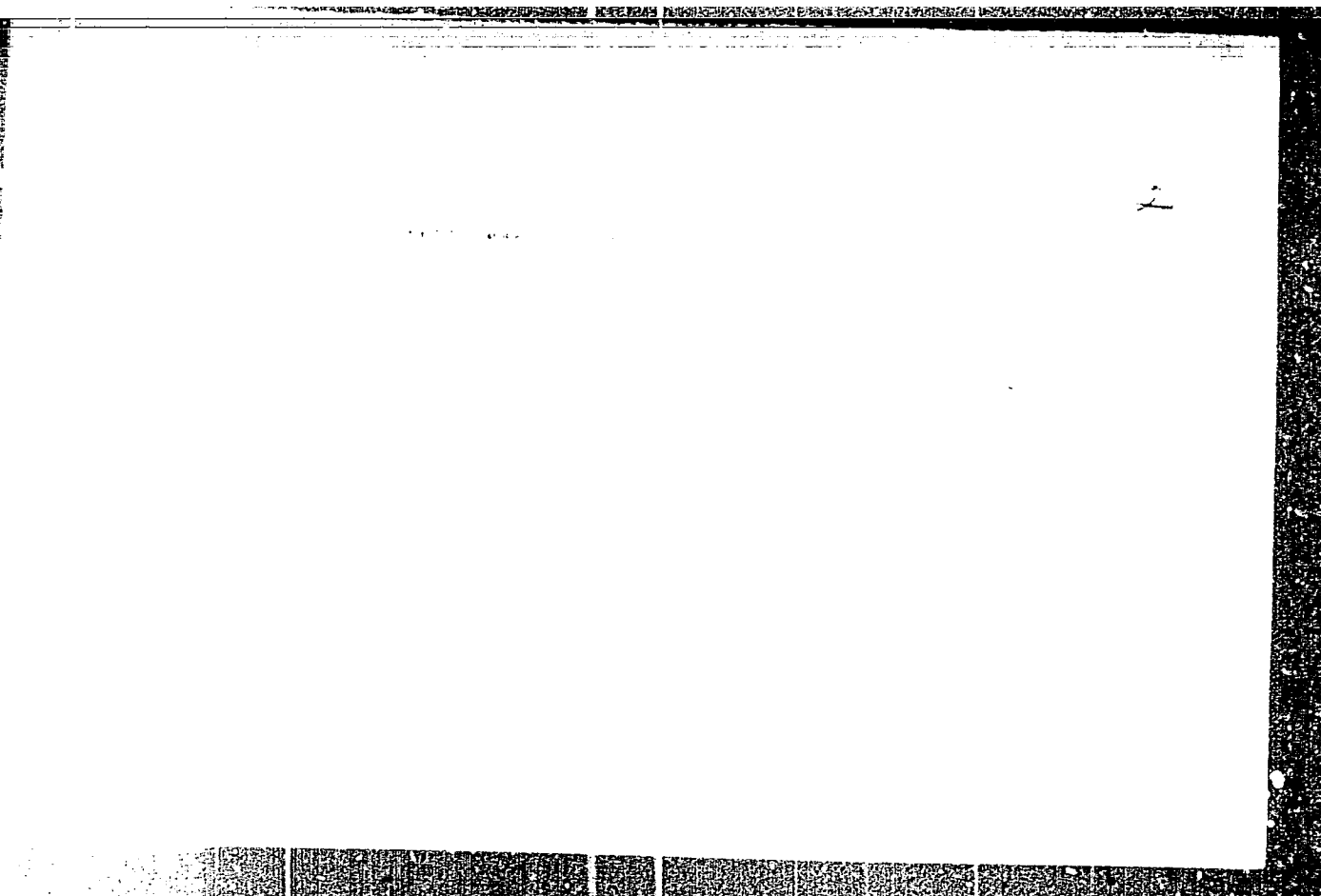


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L 26589-66 EWT(m)/EPF(n)-2/EWA(d)/T/EWP(t) IJP(c) GG/JD

ACC NR: AP6011429

SOURCE CODE: UR/0020/66/167/004/0789/0791

AUTHORS: Kritskaya, V. K.; Il'ina, V. A.; Kuznetsova, A. P.; Sharov, B. V. 50
B

ORG: Institute of Metal Science and the Physics of Metals of the Central Scientific Research Institute of Ferrous Metallurgy im. I. P. Bardin (Institut metallovedeniya i fiziki metallov Tsentral'nogo nauchno-issledovatel'skogo instituta chernoy metallurgii); Institute of Theoretical and Experimental Physics (Institut teoreticheskoy i eksperimental'noy fiziki)

TITLE: Anisotropy of displacements of the atoms in the crystal lattice of the alpha phase of neutron-bombarded carbon steel

SOURCE: AN SSSR. Doklady, v. 167, no. 4, 1966, 789-791

TOPIC TAGS: carbon steel, neutron bombardment, crystal lattice deformation, crystal lattice defect, crystal anisotropy

ABSTRACT: This is a continuation of earlier work by the authors (DAN, v. 158, no. 4, 843, 1964) where anomalies were observed in the atten-

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1. 26589-66

ACC NR: AP6011429

0

uation of certain x ray reflections from neutron-bombarded steels. Since the experimental material obtained in the earlier investigation was insufficient to draw definite conclusions concerning the crystallographic directions in the lattice of the investigated metals, the authors have carried out a more complete study, using the α phase of U-9 steel. The preparation of the samples, the heat treatment, the neutron-bombardment conditions, and the x ray photography procedure were the same as before, except that a mechanical pulse counter was added to the apparatus to improve the reliability and the accuracy. To determine the variation of the intensity of the x-ray reflections from different crystallographic planes, the authors measured the integral intensities of the x ray interferences of a large number of reflections with different multiple values of h , k , and l . The results show that neutron bombardment decreases the intensity of the scattered x rays more for some planes than for others. This is taken as convincing proof that the crystallographic orientation plays an important role in the formation of point defects by neutron bombardment. The distribution of these defects is anisotropic. The mean displacement of the atoms was 0.04 \AA for the $\{h00\}$ and $\{hhh\}$ planes,

Card

2/3

L 26589-66

ACC NR: AP6011429

as against 0.025 Å for most other planes. Certain planes (for example (631)) experienced no change in scattering ability at all after bombardment. This report was presented by Academician G. V. Kurdyumov on 24 July 1965. Orig. art. has: 2 figures and 1 table.

SUB CODE: 20/ SUBM DATE: 02Jul65/ ORIG REF: 005/ OTH REF: 004

Card

3/3

BLG

L 29891-66 EWI(m)/I/EWP(t)/ETI IJP(c) JD

ACC NR: AR6008794

SOURCE CODE: UR/0277/65/000/010/0006/0006

AUTHOR: Batenin, I. V.; Il'ina, V. A.; Kritskaya, V. K.; Sharov, B.V.

TITLE: Effect of neutron irradiation¹⁹ on the structure and properties
of metals and solid solutions₁₆ 38 B

SOURCE: Ref. zh. Mashinostroitel'nyye materialy, konstruktstii i
raschet detaley mashin. Gidroprivod, Abs. 10.48.43

REF SOURCE: Sb. tr. In-t metallov, 1 fiz. metallov Tsentr. n.-i.
in-ta chernoy metallurgii, vyp. 36, 1964, 112-124

TOPIC TAGS: neutron irradiation, iron, chromium, copper, iron alloy,
hardening

ABSTRACT: Results are given of the investigation of hardening and
softening processes in iron, copper, chromium, and Fe-8% Cr; Fe-4% Ni;
Fe-6% W, which underwent neutron irradiation (an integral neutron flow
of 10^{20} and 10^{21} neutr/cm²). Neutron irradiation results in a signif-
icant hardening of material, similar to the effect of cold plastic
flow.

SUB CODE: 18,11/ SUBM DATE: none

Card 1/1 CC

KRITSKAYA, V.P.

Characteristics of the statistical organization of the speech process in schizophrenics. Zhur.nevr. i psikh. 66 no.1:162-169 '66. (MIRA 19:1)

1. Laboratoriya patopsikhologii (zaveduyushchiy Yu.F.Iolyshev)
Instituta psikhiiatrii AMN SSSR, Moskva. Submitted November 28, 1964.

KRITSKAYA, V.P.

Methodologies for studying the characteristics of the perception of speech. Trudy Gos. nauch.-issl. inst. psikh. 43:295-303 '65.

(MIRA 18:9)

1. Institut psikhiatrii AMN SSSR (direktor instituta - prof. A.V. Snezhnevskiy).

VASIL'YEV, A.M., doktor tekhn. nauk, red.; SEYFER, A.I., kand.
khim. nauk, red.; SHEYDER, Yu.A., kand. fiz.-mat. nauk,
red.; KHIISKAYA, Z.P., red.

[Informational systems] Informatsionnye sistemy. Moskva,
In-t nauchn. informatsii, 1964. 176 p. (RUSA 17:12)

1. Akademiya nauk SSSR. Institut nauchnoy informatsii.

KRITSKAYA, Z.P., red.; SOMOROV, B.A., tekhn. red.

[Institute of Scientific Information of the Academy of
Sciences of the U.S.S.R.] Institut nauchnoi informatsii
AN SSSR. Moskva, 1963. 31 p. (MIRA 16:11)

1. Akademiya nauk SSSR. Institut nauchnoy informatsii.
(Science--Information services)
(Academy of Sciences of the U.S.S.R.)

BUROV, A.I.; KRITSKAYA, Z.F.

Carrier state of leptospirosis in brown rats in Odessa.
Zhur. mikrobiol., epid. i immun. 41 no.10:131-135 '64.
(MIRA 18:5)

1. KRITSKAYA-KRYUKOVA, L.M.
2. USSR (600)
4. Fruit
7. Protection of fruit trees from spring frosts, Priroda 42 no. 4, 1953.
9. Monthly List of Russian Accessions, Library of Congress, APRIL 1953, Uncl.

KARNITSKIY, V.I., kand.med.nauk; KRITSKIY, A.A.

Rare case of irregular development of the teeth. Stomatologiya
38 no.3:73 My-Je '59. (MIRA 12:8)

1. Iz kafedry terapevticheskoy stomatologii (zav. - prof.Ye.Ye.
Platonov) i kafedry rentgenologii i radiologii (zav. - prof.I.A.
Shekhter) Moskovskogo meditsinskogo stomatologicheskogo instituta
(dir. - dotsent G.N.Belatskiy).

(TEETH--ABNORMITIES AND DEFORMITIES)

KRITSKIY, A.A.

Apparatus for obtaining separate roentgen pictures of the teeth.
Vest. rent. 1 rad. 35 no. 6:70 N-D '60. (MIRA 14:2)

1. Iz kafedry rentgenologii i radiologii (zav. - prof. I.A. Shekhter) Moskovskogo meditsinskogo stomatologicheskogo instituta (direktor - dotsent G.N. Beletskiy).
(TEETH—RADIOGRAPHY)

GARAZHA, N.N., aspirant; KRITSKIY, A.A., assistant; PRESSMAN, A.P., dotsent

Effect of chronic hypoxia on the state of the periodontrium.
Teor. i prak.stom. no.6:102-108 '63. (MIRA 18:3)

1. Iz kafedry vnutrennikh bolezney (zav. - prof. D.F.Presnyakov),
kafedry terapevticheskoy stomatologii (zav. - prof. Ye.Ye.Platonov)
i kafedry rentgenologii i radiologii (zav. - prof. I.A.Shekhter)
Moskovskogo meditsinskogo stomatologicheskogo instituta.

VOROB'YEV, Yu.I.; GORBUSHINA, P.M.; KRITSKIY, A.A.

X-ray data in hemangiomas of the mandible. Stomatologiya 42
no.3:50-54 My-Je'63 (MIRA 17:1)

1. Iz kafedry rentgenologii i radiologii (zav. - prof. I.A. Shekhtar) i kafedry khirurgicheskoy stomatologii (zav. - prof. A.I. Yevdokimov) Moskovskogo meditsinskogo stomatologicheskogo instituta.

VOROB'YEV, Yu.I., kand.med.nauk; KRITSKIY, A.A.

Decreasing the radiation dosage in intraoral roetgemograms.
Stomatologiya 41 no.5:30-31 S-O '62. (MIRA 16:4)

1. Iz kafedry rentgenologii i radiologii (zav. - prof. I.A.
Shekhter) Moskovskogo meditsinskogo stomatologicheskogo instituta.
(MOUTH---RADIOGRAPHY)

BA

344

2

KRITSKIY, A. V.

Regulator for drawing off (best) diffusion tubes. A. V. Kritskiy
Author P. 100. 1951 No 7. 31. 38. No 10. 1951. 1951. 1951. 1951.
140h - A device for drawing off a constant % of diffusion tube
(with large head variations) is described with diagrams. The device
depends on measurements of the amounts of water added to the
individual diffusers and to the battery as a whole. P. 5. 1951.

KRITSKIY, D. R.

"Peculiarities of constructions."

Programmed Control of Metal Cutting Machines. report presented at
All-Union Conference, Moscow, 13-16 Nov 1957
Vestnik Ak. Nauk SSSR, 1958, No. 2, pp. 113-115, (author Kobrinskiy. A. Ye.)

NEKRASOV, K.; KRIVITSKIY, M.; LISIYENKO, S.; KRITSKIY, G.; ROYZMAN, P.

Heat-resistant air-entrained concrete. Stroitel' 9 no.10:
5-8 0 '63. (MIRA 16:11)

1. Nauchno-issledovatel'skiy institut betona i zhelezobetona
(for Nekrasov, Krivitskiy, Lisiyenko). 2. Ust'-Kamenogorskoye
stroitel'no-montazhnoye upravleniye tresta Soyuzteplotroy
(for Kritskiy). 3. Temirtauskiy zavod yacheistogo betona
(for Royzman).

PROCEDURES AND PROPERTIES INDEX	
CA	
<p>Dialyser for hastening dialysis. G. A. Kristahl. Biochemistry 13, 458-6 (1948).—The cellophane tubes are filled with the sol. in such a manner as to leave an air bubble. The tubes are subjected to a mech. motion so that the bubble moves from one part of the tube to the other; this moves the dialyzing sol. Expts. are dialyzed in 2-6 hrs. instead of the 50-60 hrs. customarily required. H. Priestley</p>	
<p>ABX-11A METALLURGICAL LITERATURE CLASSIFICATION</p>	
<p>EDMUND STODOLSKY</p>	<p>EDMUND STODOLSKY</p>
<p>EDMUND STODOLSKY</p>	<p>EDMUND STODOLSKY</p>

Prosthetic group of phosphorylase. G. A. Kritzsh, Doklady Akad. Nauk S.S.S.R. 61, 1001-4 (1946). Phosphorylase can proceed without nucleotides in the reaction mixt. Phosphorylase was prepd. according to Cori with modifications: Rabbits were anesthetized intravenously by barbiturates or intraperitoneally by magnesium, the ext. was dialyzed and pptn. was effected at pH 7.0 instead of 6.8; for better crystn. the product was taken in the least amt. of water and dialyzed against cysteine-succinate buffer with K ions at triple the concn. used by Cori. The prepn. also gave 20-30% noncryst. material which also had high activity. Since ascorbic acid also gives a test similar to that of pentoses by the Albaum-Umbreit method (C.A. 41, 3140b), Cori's data on the presence of pentose in phosphorylase are not decisive; hence the cryst. phosphorylase was hydrolyzed by 2% H₂SO₄ 3 hrs. at 100° and the hydrolyzate, after removal of purines by CuSO₄·NaHSO₄, gave the pentose ppt. by the Salkowsky procedure (CuSO₄·CaO); decompn. of this with HCl gave a clean-cut pos. pentose test. To show that phosphorylase is possible without nucleotides, the muscle ext. (rabbit) was freed of globulins (pptd. in dialysis) and the clear soln. was dialyzed (app. for accelerated dialysis used) against tap water at 8° for 30 hrs. and phosphorylase was pptd. by (NH₄)₂SO₄; the product was active against tap water at 8° for 30 hrs. and phosphorylase was pptd. by (NH₄)₂SO₄; this phosphorylase contg. 0.2 pentose per 1 mg. protein; this ext. failed to give an active enzyme without the prosthetic group, but did show that thorough dialysis does not inactivate the enzyme. Pptn. of phosphorylase by CH₃COOH gave almost no pentose in the ppt., showing that the linkage is not a peptide-bound one. Pptd. phosphorylase

(by NH₄ sulfate as given earlier) was taken up in 2% glycerophosphate with cysteine-HCl added to pH 7.2-7.4, centrifuged and passed over activated C in chromatographic column; the filtrate contained the enzyme of almost unaltered activity, but completely free of pentose. Hence, the bond between the prosthetic group and the protein is saltlike. The pentose-free enzyme is called phosphorylase c. The active group of an enzyme and the prosthetic group are not identical, at least in some instances. The nucleotide prosthetic group of phosphorylase is thus not essential to its activity. G. M. K.

Inst. Biochem. im A. N. Bakh, Acad Sci
USSR

KRITSKIY, G. A.

Mem., Inst. Biological and Medical Chemistry, USSR Acad. Med. Sci., Moscow, -c1948-.

"Dialyser for speeding up dialysis," Biokhimiya, 13:5, 1948.

BNL Guide, 2: 4, 1949.

CA

11A

The prosthetic group of phosphorylase. G. A. Kellish, Doklady Akad. Nauk S.S.S.R. 64, 373 (1949); *ibid.* 65, 3049c. —Phosphorylase a (from rabbit muscle) treated in water with 50% CH_2COOH and centrifuged, followed by spectrophotometric examn. revealed a max. at 2540 Å, indicating sensibility of both adenine and hypoxanthine in its prosthetic group. The soln. (obtained above) was heated 7 hrs. at 100° after diln. with water, followed by heating of the evapn. residue with NH_4Cl and 10 N HCO_2H 1 hr. at 100°, neutralization to pH 5 by means of NaOH and citrate buffer in the presence of KOH and a suspension of Cu_2O , and heating 15 min. at 100°. This gave the Cu-purine ppt., which after treatment with 2% HCl and H_2S gave the purine bases, which on conversion to Ag salts and removal of Ag by HCl showed no guanine. The isolated purines showed intense max. at 2540 Å. The original soln. had (per ml.) 24% total P, 2% labile P, and 13% inorg. P. Dialysis of the CH_2COOH soln. of the prosthetic group (after neutralization) followed by concn. gave only a slight pentose test, indicating only a trace of high mol. wt. substances. The prosthetic group of this enzyme is a combination of phosphorylated derivs. of adenosine and inosine, contg. labile and stable P, which

have little effect on the phosphorylase activity. The animals contg. phosphorylase a, b, or c, differ in the nucleotide configurations in these enzymes. The plant phosphorylase (phosphorylase d) differs from these in its lack of sensitivity to adenine acid. G. M. Kosolantoff

ASB 55.4 DETAIL OF LITERATURE CLASSIFICATION

New method for preparation of crystalline phosphor-
lase. G. A. Krut'kii and E. N. Kuvaeva, *Doklady
Akad. Nauk S.S.S.R.* 64, 519-51 (1949); cf. C.A. 43.

4713g.—A solid is anesthetized by benzobarbital, decapitated, drained of most of the blood and skinned. The muscles are removed and placed in ice. After mixing and exsiccation by ice water (twice by equal wt. of water) and exsiccation by ice water, the cat is adjusted to pH with expression through cloth, the cat is adjusted to pH with expression through cloth, then through 5.8 M (0.1 M) HCl, filtered through cotton, then through filter paper (in the cat) and the filtrate is mixed with 1.3 g. Na succinate per 100 ml. After adding of 0.7 vol. acid. (NH₄)₂SO₄ adjusted to pH 7 by NaH, and let stand overnight in ice chest the soln. is decanted from crude phosphorylase, which is centrifuged off, dried on filter paper, and taken up in 8-9 ml. cysteine-succinate buffer (pH 6.8-7). The soln. is dialyzed 1 hr. for more than 24 hrs. (change soln. every 3-6 hrs.). Needles of phosphorylase are then centrifuged and washed by 0.1 M KCl (adjusted to pH 6.8-7.0). The product has 8-10 times higher phosphorylase activity in presence of adenylic acid than without the latter. Attempts to produce the enzyme totally lacking in *per se* activity failed. It is possible that the enzyme is a component of glutulin X.

G. M. Kowaloff

G. M. Koulikov

KRITSKIY, G. A.

"Concerning the Prosthetic Group of Amylophosphase
(Phosphorilase)." Thesis for degree of Cand.
Biological Sci. Sub 14 Feb 50, Inst of Biochemistry
imeni A. N. Bakh, Acad Sci USSR

Summary 71, 4 Sept 52. Dissertations Presented for
Degrees in Sci. and Engi. in Moscow in 1950. From
Vechernyaya Moskva. Jan-Dec 1950

C.A.

Apparatus for hastening dialysis in the refrigerator. C. —
A. K. Kishin (A. N. Bakh Institute, Moscow). Bio-
chimica 15, 834-6 (1980); cf. C.A. 43, 910g; Falconer and
Taylor, C.A. 36, 6133. —A large dialyzing surface is pro-
vided by placing a glass tube inside the cellophane tube.
The space between the 2 tubes (10-20 cc.) is occupied by the
dialyzing soln. The tubes are inserted into the wide arm
of a U-tube. An inverted flask furnishes the circulating
water, which drops into the narrow arm of the U-tube and
overflows from the wide arm into a 1-2-l. beaker. The
app. is mounted on a special stand, so that very little re-
frigerator space is required. H. Priestley

CA

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Determination of nucleate bases of amylophosphatase (phosphorylase) (G. A. Katskhiladze, Dokl. Akad. Nauk SSSR, 1961, 15, 419-421; cf. Hotchkiss, C. J., 42, 88614). The terms phosphorylase and phosphorylase were suggested at a time when the reversibility of the process was unknown. The synthetic action of phosphorylase predominates over its phospholytic effect. Hence phosphorylase of glycogen and starch is designated as amylophosphatase (1). Nucleate (purine) bases in the prosthetic group of 1 are detd. by treating 300 mg. of 1 with 10-15 ml. of 2-8% NH_4OH at 37° for 24 hrs. The nucleic acid is thereby depolymerized, and is not subsequently pptd. by CH_3COOH . The NH_4 is removed by passing air through the soln. CH_3COOH is added until its concn. is 5%, and the mixt. is heated at 90° for 15 min. The heating is necessary in order to split off the desoxyribonucleic acid from the protein. The protein ppt. is filtered. The filtrate contains all the nucleate bases, uncontaminated by protein hydrolytic products. To remove CH_3COOH from the filtrate, HCl is added until its concn. is N , and the soln. is extd. several times with ether. The dry residue obtained by the evapn. of the soln. under reduced pressure contains all the

nucleate bases present in the starting material. This could not have been achieved if acid hydrolysis had been employed. The prosthetic group of cryst. 1 shows an ultraviolet absorption spectrum max. at $253\text{m}\mu$. The individual bases (hypoxanthine, cytosine, uracil, adenine, and thymine) are identified by paper chromatography. Hypoxanthine is probably formed during the hydrolysis process. Further work is still required to prove the presence of guanine in 1. H. Freshy

KRITSKIY, G. A.

Mechanism of phosphorolysis reaction. G. A. Kritskiy (Acad. Sci. U.S.S.R.). *Doklady Akad. Nauk S.S.S.R.* 70, 667-70 (1980); cf. C.A. 43, 8438i. — Phosphorylase shows the following analytical results: labile P (cleaved upon pptn. with $\text{Cl}_2\text{CCO}_2\text{H}$) 0.4-0.5 γ per mg. of protein; difficultly hydrolyzable P 0.7; total achi-sol. P 0.7-0.8; P of nucleic acids 0.5-0.6; total P 1.2-1.3. Since the mol. wt. is about 400,000, some 4 mols. of labile-bound phosphate must be present in each mol. of the enzyme. The prosthetic group gave a weak but definite reaction for deoxyribonucleic acid. The enzyme in cysteine-succinate buffer at pH 7 contg. radioactive P as Na_2HPO_4 shows a rapid exchange of P, as reprecip. (4-5 times) after a 5-10 min. contact gives almost no radioactivity in the filtrate but high activity in the ppt. All radioactive P enters the labile-P fraction of the enzyme and is also readily removed by similar equilibration with ordinary Na_2HPO_4 . Hence, the idea of Doudoroff, et al. (C.A. 42, 832f) non-P transfer of glucose units by phosphorylase is erroneous. Phosphorylase of nucleosides isolated from rat liver can transfer the pentose units of one purine base to another, as shown by incubations with guanosine and hypoxanthine; these enzymes also have labile P which equilibrates itself with P of the surrounding medium. Hence phosphorolysis consists of labile binding of inorg. P, followed by cleavage of the glucoside-like link with the abd of the labile P.

G. A. Kritskiy

Inst. Biochem. im A. N. Bakh, Acad. Sci. USSR

11-A

The reaction of enzymic transfer of pentose. (G. A. Ntshali (A. N. Bakh Biochem. Inst., Moscow). Doklady Akad. Nauk S.S.S.R. 82, 290-91 (1952); cf. C.A. 44, 7307a.

Enzymic transfer of pentose from one nucleic base to another can occur, though slowly, without inorg. P or labile org. P in the medium. The latter can greatly accelerate the transfer, probably by phosphorylation of one nucleotide and rephosphorylation of the other. The labile P of nucleosidophosphatase can act as a bound coenzyme or a prosthetic group. These conclusions are based on expts. with systems composed of hypoxanthine and guanosine incubated with nucleosidophosphatase (rat liver) in the presence of H₂O alone, or with Na₂HPO₄ in various combinations. The enzyme after 10 repts. by (NH₄)₂SO₄ at pH 7 catalyzes the reaction much less actively than the enzyme not freed of labile P. Inosine was detd. by paper chromatography by using 9:1 BuOH (satd. with H₂O):HCl (all solvent after HCl hydrolysis.

G. M. Kozolapov

KRITSKI G. A. and MELIK-SARKISYAN S.S.

*Isolation of a protein with nucleoside phosphorylase and transpentosidase activity
BIOKHIMIJA 1953, 18/4 (475-479) Tables 2 Illus. 2

A new, electrophoretically homogeneous protein, *transpentosidase A*, has been isolated from liver by a fractionation method. It possesses the enzymatic activity both of transpentosidase and nucleoside phosphorylase with respect to purine riboside. Liver contains also another, electrophoretically different protein (transpentosidase B) with the same enzymatic activity. The electrophoretic mobility and the minimum content in liver of the 2 enzymic proteins have been determined.

Kotzeva - Tucumán

SO: ^CEXERPTA MEDICA, Section II Vol. 7 No. 11

pastor of the church of the Holy Trinity
Czech A. A. K. LEAN

KRITSKIY, G.A.

Paper-chromatographic study of the intermediate exchange of purines.
Trudy Khim.anal.khim. 6:512-521 '55. (MLBA 9:5)

1. Institut biokhimii imeni A.N. Bakha AN SSSR.
(Chromatographic analysis) (Purines)

U S S R .

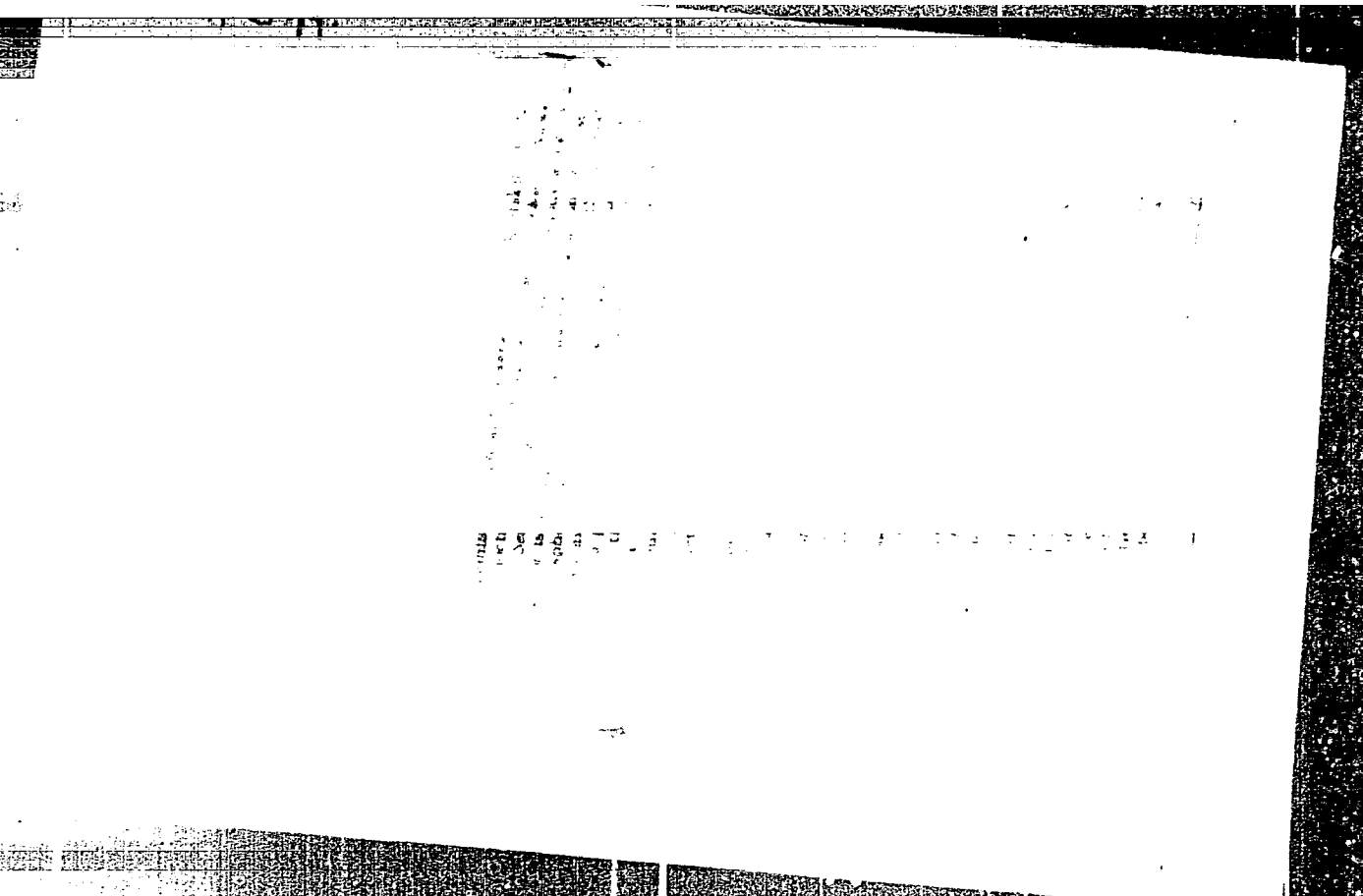
Biochemical changes in purine precursors. G. A. Kritskii (A. N. Bakht Int. Institute, Acad. Sci. U.S.S.R., Moscow). *Biochemistry* 20, 1530-1531 (1975). Studies were made of the changes in glycine-1- C^{14} , $C^{14}O_2$ and C^{14} of formic acid in the homogenates of the pigeon liver to detect the intermediate products and reactions through which purine biosynthesis passes. Liver homogenates and substrates were incubated and deproteinized by shaking with H_2O ; the flocculated proteins removed by filtration and fractions sep'd. by paper chromatography. Autoradiographs of the spots were made, their R_f values det'd., and further fractionation and identification was done by developing the radiographs by the usual methods. After 30-60 min. incubation of the pigeon liver homogenates the C^{14} of glycine-1- C^{14} appears in the purine compds., in glutamic acid, glutamine, aspartic acid and in serine; the C^{14} of $C^{14}O_2$ is found in the purine compds., the aspartic acid, glutamic acid, glutamine, serine, and glycine; the C^{14} of labeled HCO_2H is found in the purine substances, serine, glutamine, and in a bluish fluorescent substance resulting from the combination of HCO_2H and a deriv. of folic acid. The labeled precursors were also found in some still unidentified non-purine substances some of which appear to be products intermediary in the process of purine synthesis, or substances otherwise closely associated with that process. The inclusion of the C^{14} of $C^{14}O_2$ is greater the higher is the concn. of the unlabeled glycine. The inclusion of the C^{14} of $C^{14}O_2$ into the 4th position of the purine ring can be explained on the basis of partial change during serine fixation of the carboxylic group of the glycine into CO_2 . B. S. Levine

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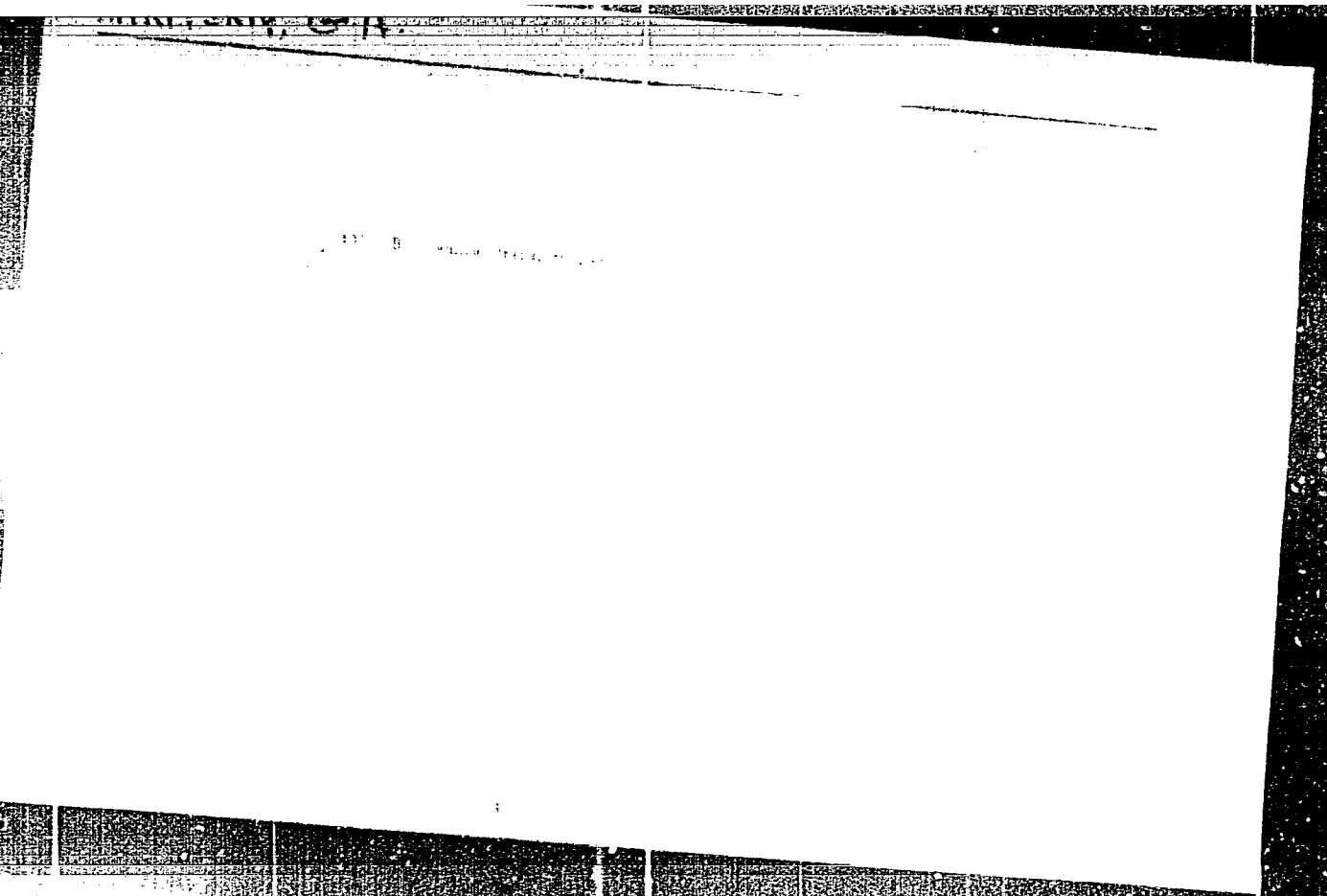


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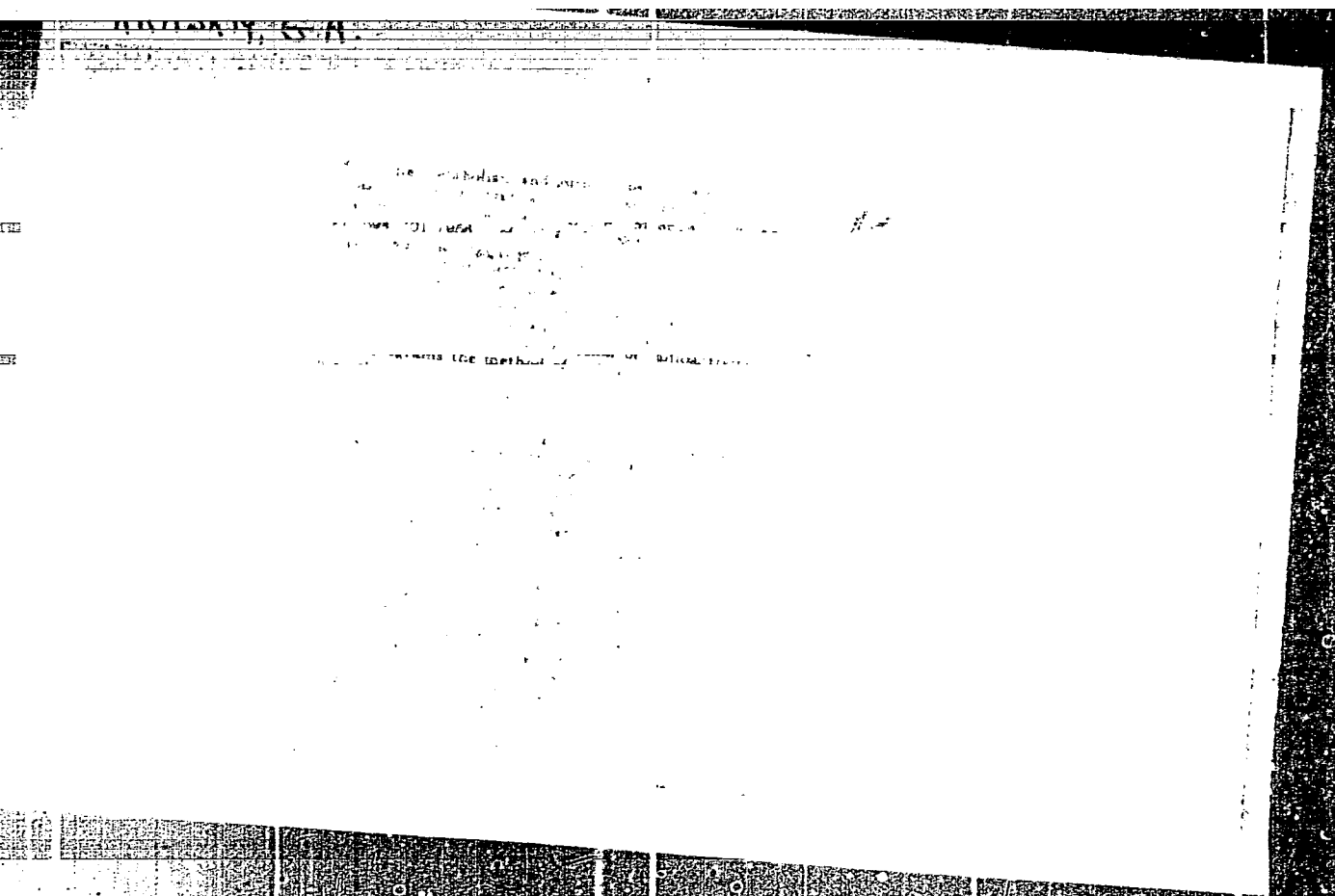
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... The ... step in ... of
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... activity ...

AUTHOR
TITLE

KRITSKIY, G.A.

PA - 2923

PERIODICAL

Interaction between the Biochemical Transformations of Inorganic Phosphate
And Desoxyribonucleic Acid.

(Vzaimosvyaz biokhimicheskikh prevrashcheniy neorganicheskogo fosfata
i dezoksiribonukleinovoy kisloty -Russian)

Doklady Akademii Nauk SSSR, 1957, Vol 113, Nr 1, pp 146-148 (U.S.S.R.)

Received 6/1957

Reviewed 7/1957

ABSTRACT

Investigation of interaction between the transformations of desoxyribonucleic acid (DNA) and of inorganic phosphate is interesting both from the general chemical and from the radio-biological point of view, since the disturbance of DNA-synthesis and of oxidizing phosphorylation is one of the most characteristic modifications of change of matter under penetrating radiation. By the application of chromatographic and radioautographic methods results were obtained which indicate the existence of some new interactions between DNA and inorganic phosphate in the organism. The interaction between the biochemical transformations of the phosphate P-32 and the DNA in tissue-homogenates were experimentally investigated. It is known that the biosynthesis of DNA takes place in bone marrow with particular intensity. Since the latter is seriously damaged by penetrating radiation, marrow of pigeons and rabbits was selected for experimental purposes. It turned out that the addition of DNA leads to a sharp increase of the phosphate-binding into a certain fraction. The results show that a binding-reaction of inorganic phosphate takes place under participation of DNA. No influence of radioactivity as such on the fixation of DNA was observed under these experimental conditions. It is inter-

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Interaction between the Biochemical Transformations of Inorganic PA -2923
Phosphate And Desoxyribonucleic Acid,

esting to note the fact that recently it was proved in the case of bacteria that polynucleotides play an important part in the oxidation of phosphoryl. It is possible that abrupt disturbance by x-ray irradiation of DNA-transformation as well as of the transformation of inorganic phosphate is due to some extent to the mentioned interactions of DNA and inorganic phosphate in metabolism. Thus, all experiments show a close interaction between biochemical transformations of inorganic phosphate and DNA. Inorganic phosphate activates DNA-spallation abruptly to the accompaniment of the formation of nucleotide.

(2 illustrations, 2 tables, 9 citations from published works)

ASSOCIATION	Biochemical Institute "A.N.Bakh" of the Academy of Science of the U.S.S.R.
PRESENTED BY	OPARIN, A.I., Member of the Academy
SUBMITTED	1.10.1956
AVAILABLE	Library of Congress
Card 2/2	

KRITSKIY, G. A.

EXCERPTA MEDICA Sec 2 Vol 12/1 Physiology Jan 59

13. EFFECT OF X-IRRADIATION ON HYPONANTHINE BIOSYNTHESIS AND GLYCINE METABOLISM IN PIGEON LIVER (Russian text) - KRITSKIY G. A. Inst. Biochem., Acad. of Sci. of the USSR, Moscow - BIOKHIMIYA 1958, 23/1 (87-91) Graphs 1 illus, 6

As shown by incorporation of glycine-1- C^{14} , synthesis of hypoxanthine in the liver homogenates of irradiated pigeons (2000 r.) somewhat increases directly after irradiation and greatly decreases in subsequent days. The incorporation of C^{14} from glycine-1- C^{14} into malic, succinic and fumaric acids is greatly reduced at any time interval following irradiation. The radiation disturbance of purine biosynthesis is largely due to a disturbance in the metabolism of the substrates which are closely connected with this biosynthesis, viz. formic acid, glutamine and other organic acids.

(11, 14)

KRITSKIY, G. A.

EXCERPTA MEDICA Sec 2 Vol 12/11 Physiology Nov 59

5487. INTERMEDIATE NUCLEOTIDE METABOLISM IN THE BONE MARROW
OF NORMAL AND IRRADIATED LIMBS (Russian text) - Kritsky G. A.
Inst. of Biochem., USSR Acad. of Med. Scis, Moscow - BIOKIMIYA 1959,
24/1 (73-79) Tables 2 illus. 2

The low-molecular purine and pyrimidine contents of the bone marrow were shown
to decrease 2 days after local X-ray irradiation in a dose of 2000 r. The total
amount of those fractions in the bone marrow of the irradiated limb was reduced by
ca. 60% versus the content in the non-irradiated limb of the same animal. Two

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days after local X-ray irradiation of one rabbit limb at a dose of 2000 r. the enzymatic activity of the bone marrow of this extremity (as regards splitting off from DNA, of purine and pyrimidine compounds soluble in 60% alcohol) decreased in 'tris' buffer solution by 43% and in orthophosphate buffer solution by 20%.

AUTHOR: Kritskiy, G. A.

20-119-2-41/60

TITLE: Effects of Ortho- and Pyrophosphate on the Decomposition Processes of Desoxyribonucleic Acid in Animal Tissues (Deystviye orto- i pirofosfata na protsessy raspada dezoksiribonukleinovoy kisloty v zhiivotnykh tkanyakh)

PERIODICAL: Doklady Akademii Nauk SSSR, 1958, Vol. 119, Nr 2, pp. 336-338 (USSR)

ABSTRACT: Investigations of the synthesis and the processes of decomposition of this acid (DNA) which have been carried out for years, have again led, to the discovery of a reversible pyrophospholysis reaction in bacteria (refs. 1,2). In earlier works the author observed the activation of the DNA cleavage in homogenates by orthophosphate without having obtained the separation of the nucleotid fraction into single components. In the present work components forming from DNA on the action of pyrophosphate are separated by chromatographing and by appl. solvent (ref. 4). Moreover, a comparison was made of the products of the enzymatic decomposition of DNA phosphate and pyrophosphate buffer solution. Th

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Effects of Ortho- and Pyrophosphate on the Decomposition
Processes of Desoxyribonucleic Acid in Animal Tissues

20-119-2-41/60

obtained indicate that in the animal organism 2 DNA decomposition products (I and II) form energetically on the action of ortho-phosphate; a further product (III) may form under the action of pyro- as well as of ortho-phosphate. Finally, a last product (IV) forms on the action of pyrophosphate. The products I - IV absorb the ultra-violet light and on paper chromatographs show a position characteristic of nucleotides. It can be seen from it that DNA conversion processes in the animal organism have certain features in common with such processes of the microorganisms although there are some differences. 3 experiments as named in the title were carried out with homogenates from pigeon liver; the conditions are given on tab. 1. The obtained filtrates were laid on chromatographic paper and a descending chromatography was carried out. A compound of 4 parts (ref. 4) ethanol + 1 part anhydrous n-butanol + 2 parts 1 M acetate ammonia buffer with pH 3,7-3,8 was used as solvent. The dried chromatographs were observed under the ultrachemoscope (ref. 5). The spots absorbing ultra-violet light were outlined

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Effects of Ortho- and Pyrophosphate on the Decomposition
Processes of Desoxyribonucleic Acid in Animal Tissues

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with a pencil. The amounts in the zone of the position of the nucleotides visible under the ultrachemoscope showed considerable differences at different conditions (fig. 1). Substance IV only forms in the presence of DNA and pyrophosphate in the sample. This indicates an enzymatic pyrophosphorolysis of the DNA in animal tissues. The formation of substances I and II (their formation as described above) indicates an enzymatic ortho-phosphorolysis (or simply phosphorolysis) of DNA in animal tissues. Substance III, as has been described above, forms probably by different processes according to the intensity of the spots on chromatographs (fig. 1). The determination of the pyro-phosphorolysis reaction of DNA is interesting also from the radiobiological point of view since the perturbation of the biosynthesis of DNA forms one of the characteristic changes of the metabolism of substances by ionizing radiation (refs. 9-11). If the synthesis of ribonucleic acid (RNA) is carried out by means of the reversible phosphorolysis reaction (refs. 12,13) while reversible pyrophosphorolysis reaction takes place in DNA synthesis,

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Effects of Ortho- and Pyrophosphate on the Decomposition
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20-119-2-41/60

nucleoside diphosphate, for DNA synthesis also nucleoside triphosphate, are necessary for the RNA synthesis. Thus, a higher "energetic barrier" must be overcome for the biosynthesis of the DNA, i.e. a higher degree of enrichment of the nucleotides by phosphates rich in energy is necessary than for RNA biosynthesis. Since this enrichment, however, takes place by oxidative phosphorylation it must be expected that by every perturbation of this phosphorylation first the DNA and only then the RNA synthesis would be perturbed. This is actually the case in ionizing radiations. Thus, the participation of the pyrophosphorolysis and phosphorolysis (ortho-phosphorolysis) reactions in the decomposition processes of DNA in animal tissues is proved. This participation may be one of the reasons for the high sensitivity of the DNA metabolism to ionizing radiations. There are 1 figure, 1 table and 16 references, 7 of which are Soviet.

ASSOCIATION:
Card 4/5

Institut biokhimii im. A. N. Bakha Akademii nauk SSSR
(Institute for Biochemistry imeni A. N. Bakh, AS USSR)

KRITSKIY, G.A.

Intermediate nucleotide metabolism in the bone marrow under normal conditions and following X irradiation [with summary in English].
Biokhimiia 24 no.1:73-79 Ja-F '59. (MIRA 12:4)

1. Institute of Biochemistry, Academy of Sciences of the U.S.S.R.,
Moscow.

(BONE MARROW, metab.

nucleotide intermediate metab., eff. of x-rays (Rus))

(NUCLEOSIDES AND NUCLEOTIDES, metab.

bone marrow, eff. of x-rays (Rus))

(ROENTGEN RAYS, effects,

on bone marrow nucleotide intermediate metab. (Rus))

KRITSKIY, G.A.

Intermediate nucleotide metabolism under normal conditions and
in radiation sickness. Izv. AN SSSR. Ser. biol. no. 4:519-532
Jl-Ag '60. (MIRA 13:8)

1. Institut biokhimi i imeni A.N. Bakha Akademii nauk SSSR.
(NUCLEOTIDES) (RADIATION SICKNESS)

KRITSKIY, G.A.; KOPTLOV, V.A.

Intermediate nucleotide metabolism in the normal and x-irradiated bone marrow. Biokhimiia 25 no.1:34-42 Ja-F '60. (MIRA 13:6)

1. Institute of Biochemistry, Academy of Sciences of the U.S.S.R., Moscow.

(NUCLEOSIDES AND NUCLEOTIDES metab.)
(BONE MARROW radiation eff.)